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Swine Facts

Feed Additives for Swine

Feed additives are widely used in the swine industry as a means of reducing production costs. There are numerous feed additives for medications on the market, each with its specific set of uses. Directions for the proper use of all approved medications can be found in publications available from Agriculture Canada.

Regulations

The Feeds Act and its associated regulations set out standards for animal feed in Canada. All feeds come under the scope of the Act, including those mixed and used on farms.

The "Compendium of Medicating Ingredients Brochure" (MIB) lists medications and other additives that can be included in feeds. It sets out the levels and combinations allowed for each animal class, and specifies any withdrawal period necessary before marketing the animal. Various trade memoranda associated with the Act specify other requirements such as the maximum amount of copper that can be included in feeds, and the maximum levels of vitamins that can be guaranteed on feed labels.

Before any medication or chemical is allowed to be included in feeds, it must satisfy two criteria: safety and efficacy. Efficacy is the ability of the additive to perform as claimed. Enforcement of the Act is carried out by federal inspectors.

The Purpose of Additives

Additives are included in swine feed to:

- improve growth rate and feed conversion efficiency
- minimize the effects of stress
- prevent or treat specific disease conditions
- control internal parasites
- improve milk production in the sow (one drug is cleared for this purpose, but is rarely used in practice)
- increase conception rate and litter size.

Note: To produce the desired effect, additives, particularly antibiotics, must be used at the proper level and time.

Types of Additives

Agriculture Canada's Medicating Ingredients Brochure classifies feed additives for either nutritional or medicinal use. These additives are further classified according to their allowed claims at different inclusion rates in the feed.

The additives commonly used in swine feeds include antibiotics, chemotherapeutics and anthelmintics. Other less commonly used additives are probiotics and metabolic stimulants. These can be defined as follows:

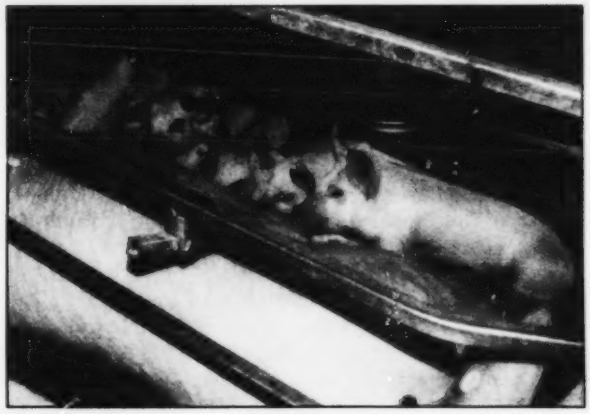
1. Antibiotics

Antibiotics are compounds synthesized by living organisms (usually bacteria or moulds) that inhibit the growth of other organisms. They are considered to improve animal performance by killing or inhibiting the growth of harmful or potentially harmful bacteria in the intestinal tracts, lungs or other parts of the animal. Some affect a relatively small number of organisms (narrow spectrum), while others are active against a wide variety of organisms (broad spectrum).

Feed additives, particularly antibiotics and chemotherapeutics, are used as medications to treat and prevent disease problems in growing swine. They are also used for nutritional purposes as growth promotants. High levels (100-200 g/tonne) are included in feed for disease treatment, while intermediate levels (50 g/tonne) are used for disease prevention. Low levels (10 g/tonne) are used for growth promotion.

2. Chemotherapeutics

Chemotherapeutics are organic compounds with properties similar to antibiotics. Unlike antibiotics,



Newborn pigs encounter many stresses and disease problems. For many producers the use of feed additives is the only way to successfully grow pigs.

they are manufactured chemically. The sulfa drugs, such as sulfamethazine, are the most common drugs in this category.

3. Anthelmintics

Anthelmintics are medications used in deworming. They are organic compounds and are generally used over a short interval. Dichlorvos, hygromycin B, fenbendazole, piperazine and pyrantel tartrate are such drugs; the choice depends on the type of worm problem. A veterinarian should be consulted for advice on the appropriate deworming drug.

Sows may be dewormed 5 to 10 days before breeding and again 10 to 14 days before farrowing. (Follow label directions of the dewormer for proper use.) Boars should be dewormed at least twice a year. Weanlings should be dewormed once after they are successfully started.

A new class of drugs called ivermectins was recently released. These have been shown to be highly effective on almost all worms in most stages of growth. They are available as injectables and are expensive. They may replace many feed medications as the dewormer of choice.

Before any worming program is followed, fecal samples should be taken to identify which worm species are present in the herd. Your veterinarian can assist you with this and provide treatment advice.

4. Probiotics

Probiotics are certain strains of bacteria which, when fed to pigs, implant themselves in the gut and block the growth of potentially harmful bacteria. This action protects the pig from the toxic effect of disease-producing organisms and any subsequent intestinal disease. *Streptococcus faecium* is used as a probiotic. At present these additives are not covered by feed regulations.

5. Metabolic Stimulants

When consumed, these compounds cause a change in the body metabolism rate. Only one such compound is approved for use in swine — thyroactive iodinated casein, which increases body metabolism in sows and may increase milk production. Use of this kind of additive should be supervised by a veterinarian.

Other Substances Used as Additives

Copper is an essential nutrient for pigs at levels of 6 mg/kg of feed. As such, it is not classified as a feed additive. Copper sulfate, carbonate or chloride, fed at levels of 100-250 mg/kg of feed, will have a growth promotant effect that is independent of and in addition to the growth response of antibacterial agents in growing pigs. In sows, high copper levels improve the weight gains of nursing pigs.

Copper may begin to have a toxic effect when fed at levels in excess of 250 mg/kg of feed for prolonged periods of time.

Effectiveness of Additives

The effectiveness of feed additives, especially antibacterials, is well established. Over the years, pigs receiving antibacterial feed additives have consistently shown improvement in rate of gain and feed efficiency. The greatest benefits have been observed in newly weaned pigs. In older pigs the effects are less pronounced. In a summarization of many trials conducted under widely varying conditions, the following has been observed:

Per Cent Improvement

	No. of Trials	Rate of Gain	Feed Efficiency
Starter Pigs 8.5-26 kg	378	16.1%	6.9%
Grower Developer Pigs 17-50 kg	280	10.7%	4.5%
Grower-Finisher Pigs 20-86 kg	279	4.0%	2.1%

Improvements from antibacterial feed additives are less apparent when the general level of environmental sanitation is improved, the disease level is reduced or stress is minimized in the growing pig. It has been frequently suggested that outside bacterial feed additives have their major effect by suppressing low-level or sub-clinical disease problems in young pigs.

For years, producers have tended to rely on feed additives for the control of disease problems. The continued use of antibacterial feed additives has become a crutch to allow producers to remain in pig production without correcting basic management or environmental deficiencies.

One of the major disadvantages of feed additives is cost. The improvement in growth rate, feed efficiency or health *must* be offset by the additional cost of rations containing feed additives. Changes in management, environment and the health status of the stock will often be a less expensive method to achieve the same result in the long term.

The decision to use an antibacterial feed additive should always be based on cost-effectiveness. Does use of the additive result in an improvement in rate of gain or feed conversion which justifies its cost? Swine producers with high health herds, kept under minimal stress in a sanitary environment, have found that the hoped-for benefits of antibacterial additives are not being obtained, especially in their grower-finisher pigs.

Additives for Nutritional Uses

Feed additives approved for nutritional use are usually used as growth promotants. They are used at very low levels in feed. With the exception of the arsenicals, they can be fed until market weight without a withdrawal period.

The choice of a growth promotant should be based on economic considerations. Additives approved for use as growth promotants in swine feed are listed in the fact sheet "Approved Medications for Use In Swine."

Additives for Medicinal Uses

Feed additives are frequently added to pig starter feeds to help young pigs cope with the stress of weaning or movement to a new barn. Resistance to disease in young pigs is low and many herds have endemic or existing disease present in their barns. Antibacterial feed additives are useful to prevent the development of stress-related diseases such as enteritis, dysentery, rhinitis and pneumonia. In some instances, additives are allowed at higher levels to treat the disease when it is present in the herd. Giving a medicated feed in the presence of disease will promote better health, increase growth rate and feed efficiency, and lower death losses.

Some medications used in starter feeds are restricted in use and may only be fed up to certain body weights or for specific periods of time. The fact sheet "Approved Medications for Use In Swine" lists a number of these additives and the various claims they are allowed to use. Veterinary advice should be obtained when selecting an additive or medication to help prevent or treat common weanling pig disease problems such as rhinitis, enteritis or pneumonia.

Additives for Sows

Antibiotics have been shown to be effective when fed to breeding animals at certain critical stages of the production cycle. A high level of about 1 g/sow/day of an absorbable antibiotic (such as one of the tetracyclines) may result in higher conception rate (+10%) and increased litter size (+0.5 pig) at the subsequent farrowing. Diagnosis of abortion due to Leptospirosis in the herd is the only allowance in the MIB for antibiotics in feed for sows.

Inclusion of antibiotics in feed at farrowing and during lactation may reduce the incidence of agalactia and uterine infections that occasionally occur in sows shortly after farrowing. As with growing pigs, the amount of improvement obtained depends on the severity of agalactia and uterine infection in the sow herd. It has also been shown that both survival rate and weaning weight of the litter may be increased in the presence of non-specific disease when sows are fed antibiotics during lactation. The use of antibiotics in sow rations for these purposes would require a veterinary prescription.

Choice of Feed Additives

Selection of a specific feed additive and the level needed for optimum response will vary with the existing disease condition, farm environment and stage of the production cycle. Therefore, veterinary advice should be sought on the choice of a feed additive. The fact sheet "Approved Medications for Use In Swine" lists approved brands and details proper usage according to disease conditions. Should the veterinarian consider it necessary, a prescription may be issued to allow use of a higher drug level than that allowed for general use. The veterinarian may also issue a prescription for the use of a drug in a class of swine where it is not ordinarily allowed.

Continuous use of the same antibiotic may lower its overall effectiveness. Periodic changes or deletion of a particular drug may be necessary. This is done best by changing rations (e.g. changing from a starter to a grower ration).

Withdrawal Periods

To be effective, a feed additive used for most medicinal purposes must reach that part of the animal where the infectious agents are located. This means the feed additives will pass through some animal tissues and may be found in the meat. Therefore, some feed additives must be withdrawn from feed for a minimum length of time before the animal can be slaughtered for human consumption. The withdrawal period simply permits sufficient time for an animal to excrete the feed additives from its body tissues before it is slaughtered. This ensures the carcass will meet standards for human consumption. Withdrawal periods vary depending on the kind of feed additive.

Producers must observe appropriate withdrawal periods. Failure to do so is likely to result in unacceptable residues in the carcass, making the producer liable to prosecution under The Food and Drug Act. Under this Act, drug residues in carcasses are monitored as part of the meat safety program.

Proper Use of Feed Additives

The fact sheet "Avoiding Drug Residues in Pork" provides additional information relating to drug residues. The need to observe all details relating to drug use should be obvious.

1. Read the tag to be sure of using the medicated feed for the right production stage and for tested and approved reasons.
2. Observe withdrawal periods to avoid residues and to ensure safe and wholesome pork.
3. Use medicated feeds only for the purpose and species indicated. Drugs that are effective and approved for use in other species or animals may not be effective in swine.
4. Use drugs only at the levels recommended by the manufacturer or veterinarian. These levels are proven to be effective and safe. Too low a level may cause resistance to develop in the disease organism while too high a level may be toxic to the animal.
5. Without professional approval do not give additional drugs through water medication or by injection to animals on medicated feed. One drug may interfere with the effectiveness of another.
6. Do not permit other drugs to contaminate medicated or non-medicated feeds through mixer contamination or other means.

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